FRENCH REPUBLIC (11) Publication no.: **2313949**

NATIONAL INSTITUTE
OF INTELLECTUAL PROPERTY

PARIS

A1

PATENT APPLICATION

(21) Registration number: **76 17587**

---

(54) Single- or double-shank cutting loop device for resectoscope

(51) Int. Patent Class: A 61 N 3/02

(22) Filing date: JUNE 10, 1976 at 15:52 hours

(33) (32) (31) Priority: Patent application filed in the Federal Republic of Germany on June 11, 1975, no. P 25 25 982.9 on behalf of the applicant.

(41) Date of public availability of application: Official Bulletin, "Lists," n. 1, January 7, 1977

---

(71) Applicant(s): Richard Wolf GmBH, Federal Republic of Germany

(72) Inventor(s): Siegfried Hiltebrandt and Ludwig Bonnet

(73) Assignee: same as (71)

(74) Attorney or Agent: Harlé et Léchopiez

The present invention relates to a resectoscope cutting loop having two shanks or even a single shank extended by a distal fork, capable of being powered by a high-frequency current, wherein the semi-circular loop element is situated in a plane that is perpendicular or appreciably perpendicular to the longitudinal direction of the instrument.

In resectoscopy, unipolar cutting loops have been used until now to remove prostatic adenomas. These devices are placed in what is known as an electrotome, to which is attached an exterior sheath and which is powered by a high-frequency current. In practice, it is connected to the active pole of a high-frequency generator while the inactive pole of the high-frequency circuit is connected to the patient's body by means of an element with a large surface area. Through longitudinal movement of the stirrup-shaped cutting loop in the proximal direction, the prostatic adenoma is removed in strips. Using such unipolar cutting loops, disturbances can result in capacitive current transfers, which are undesirable and uncontrollable in the direction of the exterior sheath and result in injury to the mucous of the ureter, ultimately leading to ureteral stenosis. When the resectoscope is introduced, lubricants are used to create an insulating layer between the external sheath and the wall of the ureter, which layer is destroyed by the passage of a strong capacitive HF current, resulting in the production of unwanted coagulation that can eventually lead to ureteral stenosis.

The invention is designed to avoid the uncontrollable capacitive transfer of HF current during resection of the prostate using cutting loops powered by high-frequency current.

The resectoscope cutting loop according to the invention consists of two parallel wire loops, wherein the proximal loop can be connected by means of a shank or fork arm to the active pole, while the distal loop can be connected by means of the other shank or the other fork arm to the inactive pole of a HF current circuit.

Thus, it is possible to apply HF current in a bipolar manner to prostate tissue intended for removal without producing uncontrollable current transfers. It is essential that the wire loop corresponding to the proximal end of the resectoscope always serve as the active pole of the HF current, that is, the end turned toward the eye of the practitioner, so that the prostatic adenoma can be removed in the cutting direction, that is, from the distal end to the proximal end, while maintaining visual control of the field of operation. The distance between the two parallel loops can vary with the HF voltage between 0.3 and 2 mm. In each case, the HF current transfer, which has a coagulant effect, occurs from the proximal loop to the distal loop, which prevents the unwanted coagulation of tissue.

Other advantages and characteristics of the invention will be provided in the description that follows. This description is purely illustrative and non-limiting. References are to the attached drawing, in which:

Fig.1 represents a double-shank bipolar cutting loop shown in a partial longitudinal cross-section, the distal parts of the loop being enlarged in the drawing.

Fig. 2 is a plan view of a part of the cutting loop of figure 1, shown at its actual size.

Fig. 3 is an enlarged longitudinal cross-section of a single-shank bipolar cutting loop.

Fig. 4 is a plan view of the cutting loop of figure 3 shown at its actual size.

In figures 1 and 3, the wire loops of the cutting electrode are turned slightly or offset with respect to figures 2 and 4 to improve the illustration.

In the case of the double-shank cutting electrode of figures 1 and 2, the threaded proximal part 1 is connected to one of shanks 2 of active HF current conductor 3, formed, for example, by a copper wire onto which is brazed the end of conducting tubular sheath 4, whose other end is brazed to wire loop 5, consisting, for example, of a special tungsten wire that is bent back at its distal end in a plane perpendicular to its longitudinal direction so as to form semicircular loop 6, while its other free end 7 is mounted in the distal region of metal sleeve 8 of other shank 9.

Structurally, shank 9, which provides the connection with the inactive pole of the HF current source, is identical to shank 2, which is connected to active conductor 3. Here we have designated identical elements using the same numerical references to which the letter "a" is added. In each case, inactive wire loop 6a is placed on the distal side of active loop 6.

The distance between the two wire loops 6 and 6a, which are parallel and semicircular in shape and have the same bend radius, is a function of the HF voltage, and comprised between approximately 0.3 and 2 mm. Spacing can be maintained at a fixed value by the use of insulated spacers. Current conductors 3, 3a, the straight portions of loops 5 and 5a, and tubular sheaths 4, 4a, are respectively wound with flexible insulator 10, 10a, which is highly resistant to electrical breakdown, and which terminates at the distal end immediately forward of loops 6, 6a. Depending on the type of resectoscope used, flexible insulator 10, 10a can be provided with small metal guide tube 11, 11a, which is extended on the distal side by flexible insulating element 12, 12a surrounding metal sleeve 8, 8a.

In the single-shank embodiment shown in figures 3 and 4, shank 13 is extended on the distal side by fork arms 14 and 14a. Straight portion 5 of active loop 6 is introduced into arm 14, free end 7 of said loop being mounted in other arm 14a in the manner described with reference to figures 1 and 2, while straight portion 5a of inactive loop 6a, located on the distal side and whose free end 7a is mounted in arm

14, is introduced into arm 14a. In this case, the proximal extremities of the straight portions of loops 5 and 5a are also brazed to conducting tubular metal sheath 4, 4a, said sheaths being insulated from each other. Tubular sheath 4 is brazed to metal sleeve 15, which is connected at 16 to conducting wire 3 by means of eccentric bushing 17 welded to contact bushing 18, which is connected to the active pole of the HF current source. On the proximal side, tubular sheath 4a is brazed to insulated and inactive conducting wire 3a, which is connected on the proximal side to contact 1a, itself connected to the inactive pole of the HF current source.

In this case as well, wire loop 6, connected to the active pole of the HF current source, must be placed on the proximal side, ahead of wire loop 6a, which must be connected to the inactive pole. Also, in this situation the two parallel semicircular loops having the same bend radius are spaced a known distance apart, as described above with reference to figures 1 and 2. Moreover, in the embodiment shown in figures 3 and 4, the proximal side of fork 14, 14a is provided with metal sectional tube 11, flattened on one side and having an oval shape so as to function as a guide and prevent rotation in the resectoscope.

In the embodiment shown in figures 3 and 4, loop 6, located on the proximal side, can also be connected to contact 1a, intended to be connected to the active pole of the HF current source, while contact bushing 18, intended to be connected to the inactive pole, is connected to wire loop 6a, located on the distal side.

CLAIMS

1. A resectoscope cutting loop having two shanks or a single shank extended by a distal fork, capable of being powered by a high-frequency current, wherein the semi-circular loop element is situated in a plane that is perpendicular or approximately perpendicular to the longitudinal direction of the instrument, characterized in that the cutting loop consists of two parallel loops (6, 6a), wherein the proximal loop (6) is connected by means of a shank (2) or a fork arm (14) to the active pole of an HF current source, while the distal loop (6a) is connected by means of the other shank (9) or the other fork arm (14a) to the inactive pole of the source.

2. Cutting loop according to claim 1, characterized in that the free end (7) of one of the wire loops (6), capable of connection to the active pole of the HF current source by means of one of the shanks (2) or one of the fork arms (14), and the free end (7) of the other wire loop, capable of connection by means of the other shank (9) or the other fork arm (14a) to the inactive pole of the source of the other loop (6a), are mounted respectively in insulated manner at the distal end of the other shank or the other fork arm.

3. Cutting loop according to any of claims 1 or 2, characterized in that the distance separating the two parallel wire loops (6, 6a) is comprised, depending on the HF voltage, between approximately 0.3 and 2 mm.

4. Cutting loop according to any of claims 1 to 3, characterized in that the distance separating the two parallel loops (6, 6a) is determined by the insulated spacers.

5. Cutting loop according to any of claims 1 to 4, characterized in that the connection between the loops (6, 6a), formed of a special tungsten wire, and the proximal contacts of the shanks (2, 9) or shank (13) is realized by means of a conducting tubular sheath and a current conductor (3, 3a), terminating in said contacts (1, 1a, 18).

[A single page of drawings follows.]